

Please replace the paragraph beginning on line 22 of page 26, with the following:

A 37 It is also contemplated that the pressure control 230 could be a separate control from the actuator 212. For example, a hydraulic system may be used to determine and monitor the pressure of the brush 208 on the floor 210 independent of the position of the actuator 212.

Please replace the paragraph beginning on line 27 of page 26, with the following:

A 38 It is also contemplated that any of the above described embodiments may include displays indicating actual pressure, torque (or current) and/or position to assist the operator in setting or adjusting the controls. For example, a 10-segment bar graph may be positioned adjacent the head position control 228 to indicate motor current. This would also permit the operator to repeat the same cleaning parameters. Alternatively, the systems of the invention may include a memory 222 for storing various operator settings so that the operator could program the memory 222 and recall the parameter settings as needed.

IN THE CLAIMS:

Please replace claims 8, 10, 11, 13, 17, and 20 as follows:

9. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

- a vehicle adapted to ride on the surface;
- a head assembly adapted to carry a device for engaging and treating the surface;
- an actuator on the vehicle supporting the head assembly over the surface and adapted to raise and lower the head assembly relative to the surface;
- a sensor detecting a position of the head assembly relative to the surface;
- a head position control, responsive to input from the operator, indicating a desired position of the head assembly relative to the surface;
- a driving circuit responsive to the head position control and responsive to the sensor for energizing the actuator to raise and lower the head assembly so that the position of the head assembly relative to the surface as detected by the sensor corresponds to the desired position as indicated by the head position control thereby controlling the relative engagement between the

head assembly and the surface and thereby controlling the treatment of the surface by the head assembly;

a support connected to the actuator and being raised and lowered by the actuator; and

a connector assembly including a compressible member between the support and the head assembly;

A 39 wherein the sensor comprises a distance sensor connected between the support and the head assembly for detecting a distance between the support and the head assembly; and

wherein the driving circuit responds to the distance sensor to control the head position of the head assembly relative to the surface to maintain contact between the head assembly and the surface.

11/10. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

a vehicle adapted to ride on the surface;

a head assembly adapted to carry a device for engaging and treating the surface;

an actuator on the vehicle supporting the head assembly over the surface and adapted to raise and lower the head assembly relative to the surface;

a sensor detecting a position of the head assembly relative to the surface;

A 40 a head position control, responsive to input from the operator, indicating a desired position of the head assembly relative to the surface;

a driving circuit responsive to the head position control and responsive to the sensor for energizing the actuator to raise and lower the head assembly so that the position of the head assembly relative to the surface as detected by the sensor corresponds to the desired position as indicated by the head position control thereby controlling the relative engagement between the head assembly and the surface and thereby controlling the treatment of the surface by the head assembly;

a support adapted to be raised and lowered by the actuator; and

a compressible member of variable length between the support and the head assembly;

wherein the sensor comprises a linear sensor detecting a length of the compressible member.

12
11. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

a vehicle adapted to ride on the surface;

a head assembly adapted to carry a device for engaging and treating the surface;

an actuator on the vehicle supporting the head assembly over the surface and adapted to raise and lower the head assembly relative to the surface wherein the actuator comprises a motor rotating a screw driving a traveling nut engaging the screw, said nut being raised and lowered by rotation of the screw;

a sensor detecting a position of the head assembly relative to the surface;

a head position control, responsive to input from the operator, indicating a desired position of the head assembly relative to the surface;

A 40 a driving circuit responsive to the head position control and responsive to the sensor for energizing the actuator to raise and lower the head assembly so that the position of the head assembly relative to the surface as detected by the sensor corresponds to the desired position as indicated by the head position control thereby controlling the relative engagement between the head assembly and the surface and thereby controlling the treatment of the surface by the head assembly;

a slotted tube having a slot at one end receiving a pin sliding within the slot, the pin connected to the traveling nut, the tube supporting the head assembly at its other end; and

a compressible member within the tube having one end engaging the nut and having another end engaging the tube;

wherein the sensor comprises a linear sensor detecting a length of the compressible member.

13. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

a vehicle adapted to ride on the surface;

a head assembly adapted to carry a device for engaging and treating the surface;

A 41 an actuator on the vehicle supporting the head assembly over the surface and adapted to raise and lower the head assembly relative to the surface;

a sensor detecting a position of the head assembly relative to the surface;

a head position control, responsive to input from the operator, indicating a desired position of the head assembly relative to the surface;

a driving circuit responsive to the head position control and responsive to the sensor for energizing the actuator to raise and lower the head assembly so that the position of the head assembly relative to the surface as detected by the sensor corresponds to the desired position as indicated by the head position control thereby controlling the relative engagement between the

head assembly and the surface and thereby controlling the treatment of the surface by the head assembly;

wherein the actuator comprises a motor rotating a screw driving a traveling nut engaging the screw, said nut being raised and lowered by rotation of the screw;

wherein the sensor comprises a detector for providing a count corresponding to the position of the head;

wherein the head position control is set by the operator to indicate the additional preset amount; and

A 41 a comparator for comparing the count to the additional preset amount, said driving circuit being responsive to comparator to lower the traveling nut below a repeatable position when the count corresponds to a position which is higher than the additional preset amount as indicated by the head position control.

19. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

A 42 a vehicle adapted to ride on the surface;
a head assembly adapted to carry a device for engaging and treating the surface;
an actuator on the vehicle supporting the head assembly over the surface and adapted to raise and lower the head assembly relative to the surface;

a sensor detecting a position of the head assembly relative to the surface;
a head position control, responsive to input from the operator, indicating a desired position of the head assembly relative to the surface; and

a driving circuit responsive to the head position control and responsive to the sensor for energizing the actuator to raise and lower the head assembly so that the position of the head assembly relative to the surface as detected by the sensor corresponds to the desired position as indicated by the head position control thereby controlling the relative engagement between the head assembly and the surface and thereby controlling the treatment of the surface by the head assembly;

wherein the sensor comprises a switch on the actuator for detecting a position of the head assembly.

20. An apparatus for use on a surface and responsive to an operator, said apparatus comprising:

A 43 a head assembly adapted to carry a device for engaging the surface;

an actuator raising and lowering the head assembly relative to the surface;

a position control responsive to operator input for indicating a head position of the device relative to the surface or range of head positions of the device relative to the surface, said head position or said range of head positions indicating a distance or range of distances, respectively, between the device and the surface;

a controller responsive to the position control for selectively actuating the actuator to maintain the device in the head position or within the range of head positions as indicated by the position control;

a motor on the head assembly for rotating the device;

A 43 a torque control circuit having an input receiving a signal for controlling the torque of the motor; and

a torque control responsive to operator input for indicating a desired torque or a desired range of torques for the motor;

wherein the controller is responsive to the torque control for providing a torque control signal to the input of the torque control circuit to maintain the motor at the desired torque or within the desired range of torques.
